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Experiment to evaluate feasibility of utilizing SKYLAB-EREP remote sensing data for tectonic analysis of the Bighorn Mountains region, Wyoming-Montana

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STATUS SUMMARY

Imagery received from SL-3, Sept. 1973
Tracer 59, Bear Lake, Utah-Idaho - Bison, S.D.

a. S-190A 70 mm. transparencies, Frames 203-215
   1) Pan-X RL42 .5-.6 um
   2) Pan-X RL41 .6-.7 um
   3) IR RL37 .7-.8 um
   4) IR RL38 .8-.9 um
   5) Color IR RL39
   6) Color RL40

b. S-190B Frames 14-22 RL88. Color. 10% overlap

Coverage Conditions

Clear over Bear Lake, partly cloudy over Wind River Mountains and Basin, Sattered thin clouds over southern Bighorn basin and Owl Creek Mountains. Overcast over southern Bighorns. Clear to partly cloudy over northeastern Powder River basin and northwestern Black Hills.

IMAGE EVALUATION

S-190A

Of the black and white bands, the red band is by far the best in both resolution and in tonal contrast. All four bands are quite useable in the addicol viewer. The color IR is quite dark but probably can be lightened in processing. The color is also slightly dark but is the best single band for geologic interpretation; red beds stand out particularly well. Complete stereo coverage.

S190B

Excellent detail, color mainly shades of brown. Unfortunately, the 10% overlap does not allow much stereo viewing.

GEOLOGIC INTERPRETATIONS

As only the 70 mm transparencies were available and these tended to be dark and some areas were cloud covered, interpretations could only be very general [9 x 9 transparencies have since been received]. Tappmeyer, as a part of his study in the southwest Bighorns - southeast Big Horn basin, found that the S-190A color frames 207, 208, 209 (Roll 40) were of some value in outlining some broad mapping units. He was able to delineate 5 units - Precambrian, Cambrian-Pennsylvanian Units, Phephoria-Gypsum Springs formations, and Mesaverde-Lance formations, and Tertiary units.

I have found on these frames and on S-190B color frame 018(Roll 88) that in addition to being able to delineate a series of northwest-trending faults, most of which are known, that I can delineate three east-northeast trending linears marked by straight drainage segments, possible faults, and formational contacts. Both of these sets obliquely cross the east-west trending Owl Creek-Bridger uplifts.

ACTIVITIES PLANNED FOR NEXT QUARTER

We are now working with the SL-3, S-190A 9 x 9 transparencies. Hopefully, SL-4 material will become available. Field work is planned for late June - early July. Unless suitable imagery in the Bighorns is received from SL-4, we shall be unable to do any glacial feature analysis. If this is the case, I would like to substitute some additional field work in the northern Black Hills where we have good imagery coverage.

I shall be giving a paper at the Basement Tectonics Conference in Salt Lake City in early June. The Skylab interpretations given there will be based on results already communicated through these reports.

SUMMARY OF SIGNIFICANT RESULTS

Analysis of SL-3, S-190A, and S190B color frames indicates two sets of linears obliquely cutting across the east-west trending Owl Creek-Bridger uplifts. A northwest set of faults and folds has been mapped previously but the imagery indicates some changes and addition of detail can be made. A less pronounced east-northeast set of linear alignments (drainage segments, lithologic contacts, possible faults) extends into the southeast part of the Big Horn basin.